CONSTRUCTION NOTES:

1—Excavate to bottom of concrete apron and toewall. Forms are not required for concrete if excavated soil will stand vertically. Slope sides of excavation above top of concrete to 1:1 slope or flatter. Dewater site as needed.

2—Place wood posts and lowest horizontal boards in place.

3—Place reinforcing steel in apron and toewall.

4—Place concrete in apron and toewall. Finish concrete to cover one inch of the bottom board on the inside of the box and flush with the bottom of the lowest board on the outside of the box.

5—Complete assembly of wood structure.*

*Note:

A—Board ends located so that soil load puts fastener in tension shall be attached to post with 1 bolt per board end. Washers shall be used under bolt head and under nut. Tighten nut to bolt on side of board or post to be backfilled against.

B—Cut holes for subsurface pipes, making clean cut for tight fit around pipe. Place 2" x 4" treated cleats next to pipe on backfill side of wall. Fasten with nails, 2 nails per board in wall.

6— Install 6 mil plastic sheeting to backfill side of wingwalls, sidewalls and headwall. Place drain tubing and drain outlet pipes. Lay subsurface drain to outlet pipes, where required. Apply mastic around outlet pipes to seal holes.

7—Backfill around structure with moist soil. Place backfill in shallow layers and tamp well so that backfill is denser than adjacent existing soil. Remove dry soil from sides of excavation as backfill is placed so that moist soil is tamped against moist soil. Keep backfill approximately level around all parts of the structure.

8—Place riprap and complete shaping and grading.

9—Lime, fertilize, seed and mulch all disturbed areas.

CONSTRUCTION DATA

LAYOUT BY _____ DATE _____

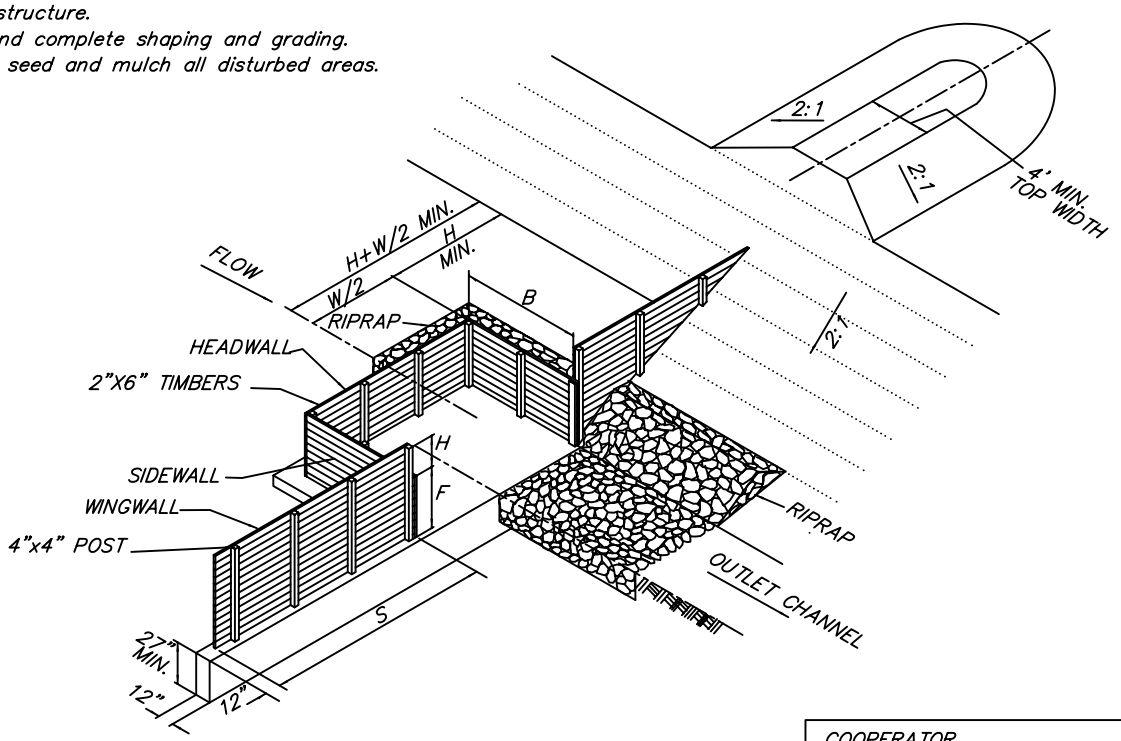
CONTRACTOR _____ DATE COMPLETED _____

PRACTICE (DOES)(DOES NOT) MEET STANDARDS AND SPECIFICATIONS.

CHECKED BY _____ DATE _____

PROVIDE AN EMERGENCY SPILLWAY, ONE ON EACH SIDE IF FEASIBLE, WITH CREST ELEVATION 0.3' TO 0.5' BELOW TOP OF WINGWALL ELEVATION.

REFERENCE: ENGINEERING FIELD MANUAL, CHAPTER 6.



ELEVATIONS	STRUCTURE DIMENSIONS	LIMITATIONS
TOP OF LEVEE	F	F ≤ 4.0'
TOP OF WINGWALL	H	H ≤ 0.75F
EMERGENCY SPILLWAY	W	W ≥ F(12' MAX.*)
WEIR CREST	B	1.5F ≤ B ≤ W
DRAIN OUTLET FLOWLINE	S	S ≥ [2(H+F)+1]
CONCRETE APRON		(*WITHOUT BRACES)

BENCH MARK

ELEVATION _____

DESCRIPTION _____

COOPERATOR _____

_____ COUNTY SWCD, INDIANA

LOCATION _____

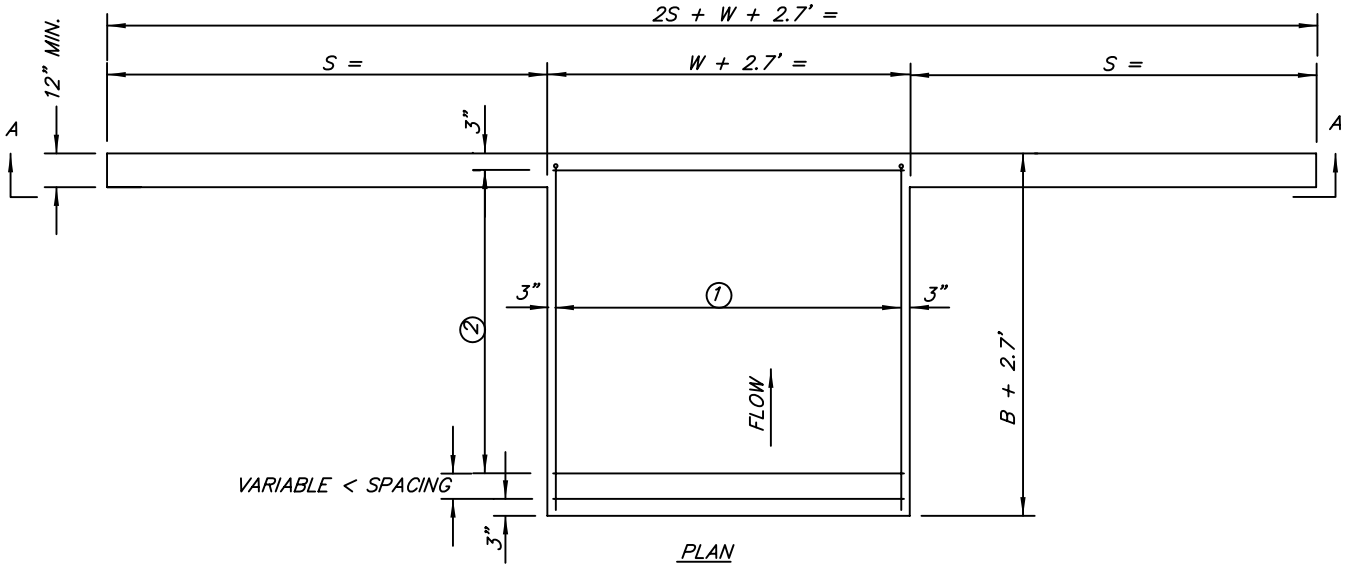
WOOD TOEWALL DROP SPILLWAY
(USING 2" TIMBERS)
(SHEET 1 OF 5)
GENERAL LAYOUT

U. S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

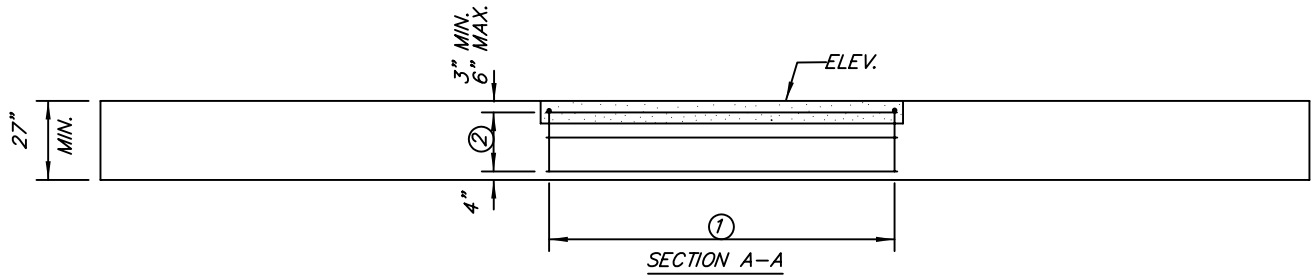
Designed		Approved By	
Drawn		Title	
Traced		Title	
Checked		Sheet No of	Drawing No.

8/89

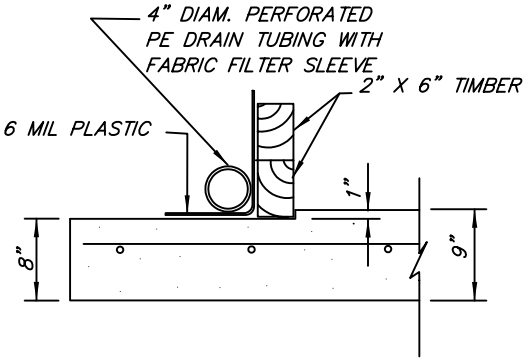
IN-ENG-55



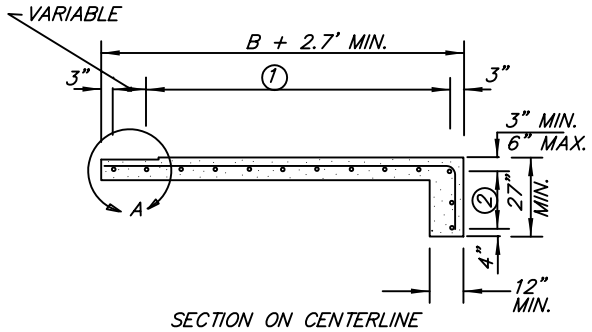
PLAN



SECTION A–A



DETAIL A



SECTION ON CENTERLINE

NOT TO SCALE

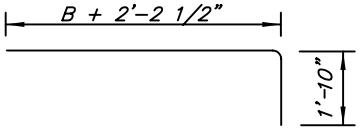
STEEL SCHEDULE

ALL REBARS SHALL BE #4 (1/2" DIAM.) OR #5 (5/8" DIAM.)

MARK	QUANTITY		LENGTH	TOTAL LENGTH	
	#4	#5		#4	#5
1	1.5(W+3)	(W+3)	(B+4.1)		
2	1.5(B+5)	(B+5)	(W+2.2)		
TOTAL LENGTH					
POUNDS PER FOOT				0.668	1.043
TOTAL WEIGHT					
MAXIMUM SPACING				8" O.C.	12" O.C.
MINIMUM SPLICE LENGTH				15"	19"

8–89

MARK (1) BARS SHALL BE BENT



MARK (2) BAR SHALL BE STRAIGHT

CONCRETE QUANTITIES

(BASED ON NEAT LINES)

(2S+W+2.7)(2.25/27) = _____

(W+2.7)(B+1.7)(0.75/27)= _____

TOTAL CU. YDS. = _____

ASSUME _____% FOR CONSTRUCTION TOLERANCE.

CONCRETE REQUIRED =_____ CU. YDS.

COOPERATOR _____

_____ COUNTY SWCD, INDIANA

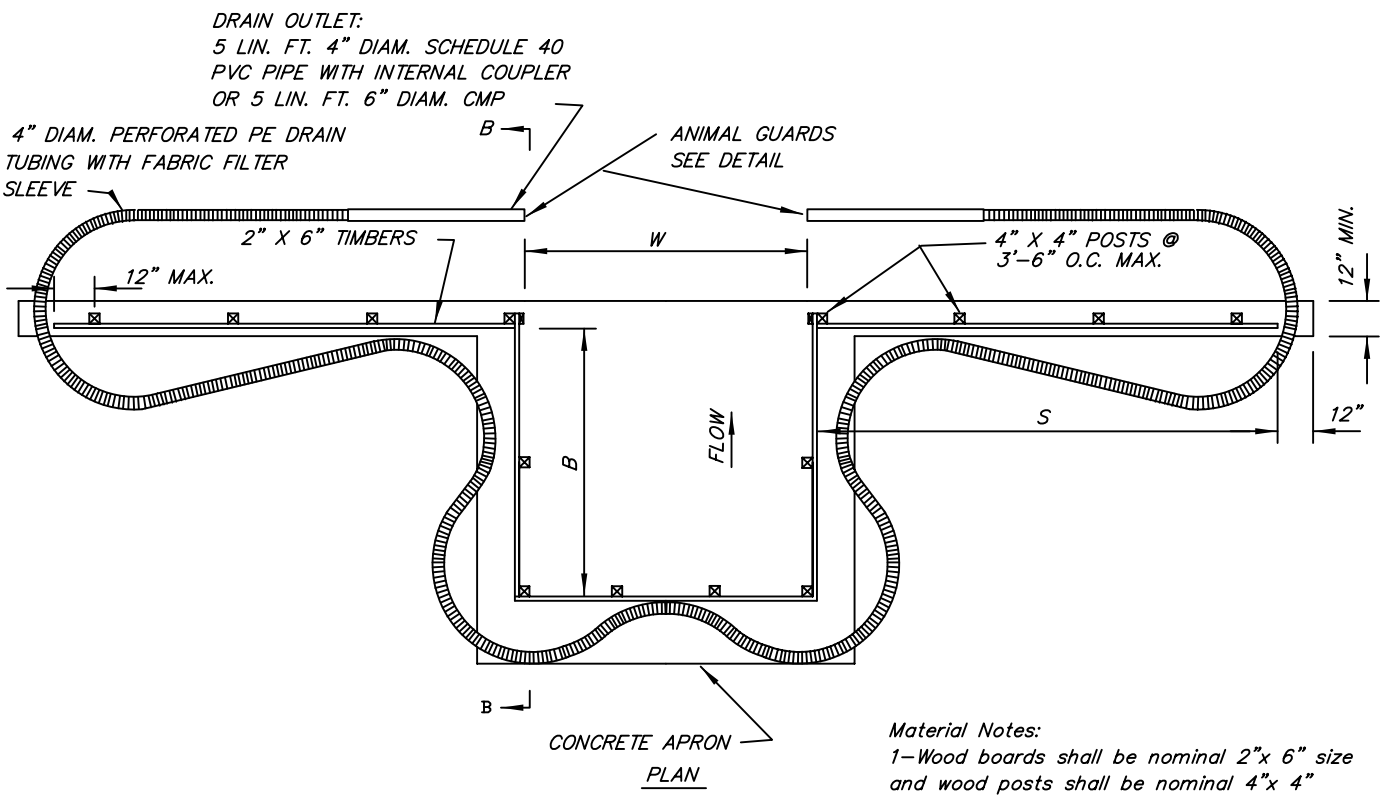
LOCATION _____

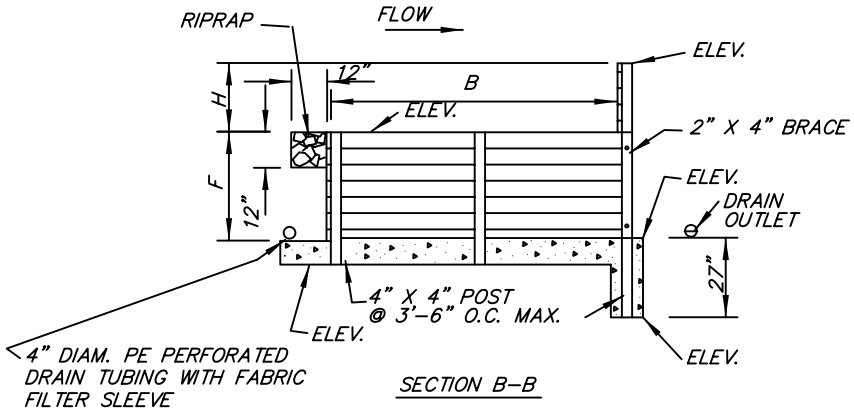
WOOD TOEWALL DROP SPILLWAY
(USING 2" TIMBERS)
(SHEET 2 OF 5)
CONCRETE DETAILS

U. S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

Designed	Approved By
Drawn	Title
Traced	Title
Checked	Sheet No. of / Drawing No.

IN–ENG–55





Material Notes:

1-Wood boards shall be nominal 2"x 6" size and wood posts shall be nominal 4"x 4" size. Wood members shall be No. 2 and treated in accordance with Federal Specification TT-W-571 for wood preservation, retaining 0.6 pounds per cubic foot chromated copper arsenate (CCA).

2-Bolts shall be No. 2 machine grade, 1/2" diameter by 8 inches long. Nuts, bolts, and washers shall be galvanized in accordance with ASTM A307 and ASTM A153.

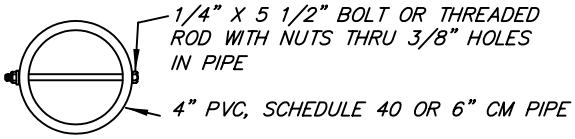
3-Nails shall be galvanized, 16d.

4-Concrete shall have a minimum compressive strength at 28 days equal to 3000 PSI (6 bag mix).

5-Plastic sheeting used on backfill side of boards shall have a minimum thickness of 6 mils and be made of polyethylene.

6-Riprap shall consist of well graded rock. Maximum size of 8 inches, minimum size of 3 inches.

NOTE:
STAPLE 6 MIL. PLASTIC TO THE BACKFILL SIDE OF WEIR AND HEADWALL TO PREVENT WATER FLOW BETWEEN TIMBERS. SEE DETAIL A.



ANIMAL GUARD DETAIL

BOLTS OR RODS SHALL BE GALVANIZED OR CADMIUM PLATED AND PLACED IN HORIZONTAL POSITION. (USE 2 HORIZONTAL BOLTS OR THREADED RODS AT 2" O. C. FOR 6" PIPE).

NOT TO SCALE

8-89

COOPERATOR _____

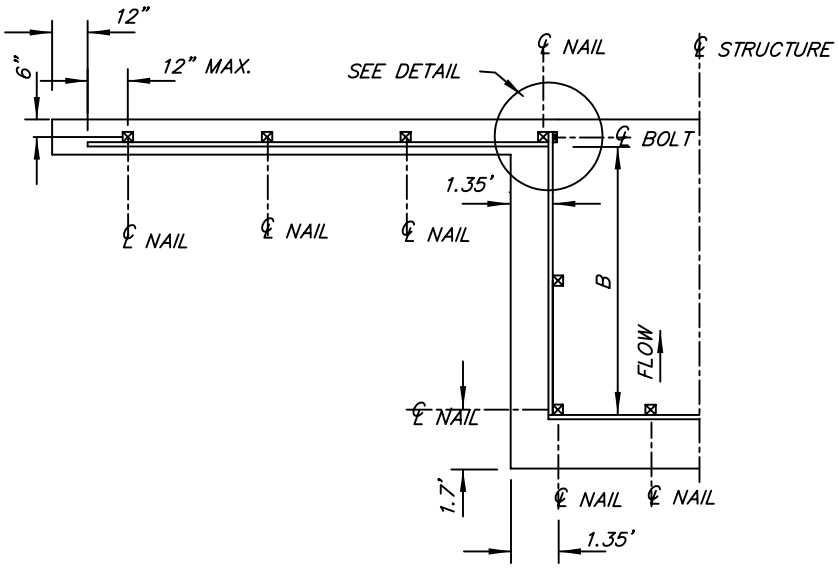
_____ COUNTY SWCD, INDIANA

LOCATION _____

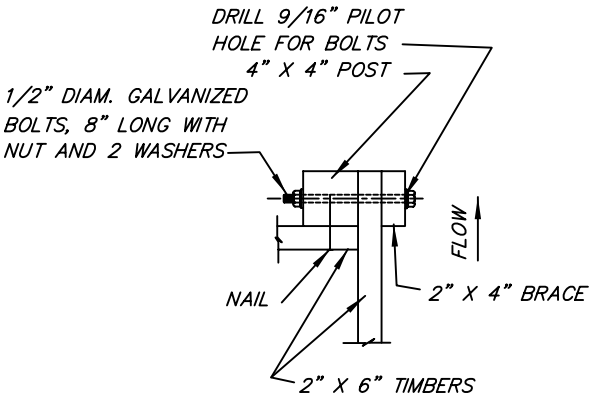
WOOD TOEWALL DROP SPILLWAY
(USING 2" TIMBERS)
(SHEET 3 OF 5)
STRUCTURE DETAILS

U. S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

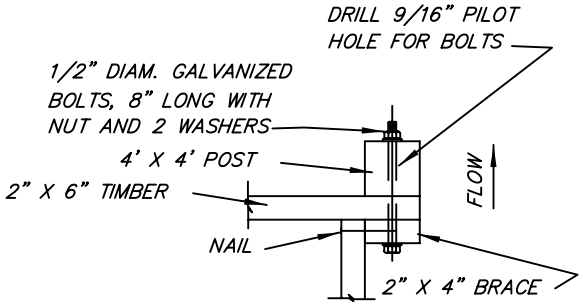
Designed	Approved By
Drawn	Title
Traced	Title
Checked	Sheet No. / Drawing No. / of



PLAN



TYPICAL DETAIL OF BOLT INSTALLATION



ALTERNATE DETAIL OF BOLT INSTALLATION

BILL OF MATERIALS

Concrete		Cu. Yds.
Reinforcing Steel–#_ ;___ Lin. Ft. or		Pounds
Wood Posts, 4"x4"x _____ (Weir Section)		Each
Wood Posts, 4"x4"x _____ (Wingwall)		Each
Wingwall Timbers, 2" x 6" x _____		Each
Headwall Timbers, 2" x 6" x _____		Each
Sidewall Timbers, 2" x 6" x _____		Each
Brace Timbers, 2" x 4" x _____	2	Each
Bolts–1/2"x 8" With Nut And 2 Washers	4	Each
Nails, Galvanized, 16d (48 nails per pound)		Pounds
4" Diam. Perforated PE Drain Tubing W/ Fabric Filter Sleeve (4S+2B+W)		Lin. Ft.
Drain Outlets with Animal Guards (5' Length of _____" Diam. Pipe) (Use Internal Couplers With 4" Diam.)	2	Each
Polyethylene sheeting, 6 mil		Sq. Yds.
Riprap		Tons
Subsurface Drain Outlet		Lin. Ft.

NOT TO SCALE 8–89

COOPERATOR _____

_____ COUNTY SWCD, INDIANA

LOCATION _____

WOOD TOEWALL DROP SPILLWAY
(USING 2" TIMBERS)
(SHEET 4 OF 5)
ALTERNATE CORNER DETAILS

U. S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

Designed		Approved By	
		Title	
Drawn			
		Title	
Traced		Sheet	Drawing No.
Checked		No of	

IN–ENG–55

GENERAL

Construction operations shall be carried out in such a manner and sequence that erosion and air and water pollution will be minimized and held within acceptable limits. Construction methods that enhance wildlife habitat will be used where practical.

The completed job shall present a workmanship apperance and shall conform to the lines, grades, and elevations shown on the drawings or as staked in the field.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used.

SITE PREPARATION

All trees, stumps, brush, and similar materials are to be removed from the construction area and disposed of in a manner consistent with environmental concerns and proper functioning of the structure.

EXCAVATION

To the extent needed, all suitable materials removed from the specified excavation shall be used in the construction of the earth fill areas of the structure. All spoil deposited adjacent to the structure and in the adjacent area shall have a positive grade to drain toward the structure.

MOISTURE CONTROL

The minimum moisture content of the fill material and foundation shall be such that when kneaded in the hand the fill material will form a ball which does not readily separate. The maximum moisture content is when conditions are too wet for efficient use of the hauling and compacting equipment.

MAINTENANCE RECOMMENDATIONS:

A maintenance program shall be established by the land user to maintain capacity and vegetative cover. Items to consider are as follows:

1—Do not graze seeded areas during establishment and when soil conditions are to wet.

2— Protect structure from damage by farm equipment and vehicles.

3—Maintain structure inlet and outlet areas free of any obstructions.

4—Repair structure as soon as possible after damage is noted.

5— Reestablish vegetative cover immediately where erosion has removed established seeding.

6—Maintain effective erosion control of the contributing watershed to prevent siltation and the resulting loss of capacity.

CONSTRUCTION TOLERANCES

Structure dimensions: —0.1 foot
Earthwork and riprap:
Elevations:
Top of levee: Grade or above.
Channel outlet: +0
Side slopes: ±0.1 ft./ft.
Widths: —0, +1.0 foot

FINISH AND CLEANUP

The structure area and the designated spoil areas will be finished in a relatively smooth condition ready for seeding. All rocks 3 inches in diameter or larger and roots shall be removed from the surface areas.

VEGETATIVE ESTABLISHMENT

Excess water shall be directed away until vegetation is established, if possible. Any protective works shall be removed and the disturbed areas shall be seeded for permanent grass.

Apply lime to raise the ph to _____ at rate of _____ tons per acre.

Fertilize according to soil tests or at a minimum rate of 500 pounds of 12—12—12 fertilizer (or its equivalent) per acre as soon as the structure has been constructed if within the seeding dates.

Work the fertilizer and lime into the soil to a depth of 2 — 3 inches with a harrow or disk. Seeding will be done at the following rates:

Seed:_____Rate: _____lbs./acre
_____Rate: _____lbs./acre

When construction is completed between May 11 and August 9, a temporary cover crop should be established using the following seeding:

Seed: _____Rate: _____lbs./acre

Dormant seeding may be done between December 10 and February 28. Liming, fertilizing, seedbed preparation and mulching may be done ahead of the dormant seeding, with the seed being broadcast on top of the mulch.

Apply mulch at the rate of _____ tons of straw per acre.

COOPERATOR _____
_____ COUNTY SWCD, INDIANA
LOCATION _____
_____

WOOD TOEWALL DROP SPILLWAY
(USING 2" TIMBERS)
(SHEET 5 OF 5)
SPECIFICATIONS

U. S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

Designed	Approved By
Drawn	Title
Traced	Title
Checked	Sheet No of / Drawing No.

8—89

IN—ENG—55